Alternative 3

CALFED
BAY-DELTA
PROGRAM

B-001103

Alternative 3 - Summary

Ship Channel Conveyance

Emphasis

Relocate export diversion facility above critical Delta smelt habitat through development of isolated conveyance facilities with a combination of environmental, water quality, and levee measures.

Distinguishing Features

This alternative is intended to provide a **moderate** level of resource improvement and conflict resolution.

Physical/Structural	Operational/Management	Institutional/Policy
• Relocate diversion point to the west side of the Sacramento River above Sacramento near the Sacramento Weir • Isolated transfer facility (approximately 10,000 cfs) using existing infrastructure such as the Sacramento Ship Channel or the Yolo Bypass • New storage facility in the north Delta • New storage facility in the south Delta • Moderate level of habitat restoration with fish screens and Old River bypass • Moderate levee improvements	• Manage new storage to reduce fish entrainment and increase Delta outflow during critical periods • Purchase approximately 100 TAF from the San Joaquin River or tributaries for environmental water supply purposes • Real-time monitoring to minimize diversion impacts • Urban and agricultural wastewater reclamation programs	• Source control of pollutants to improve water quality • Improved dredging policies to protect levees and improve water quality • Funded levee improvements, emergency management plan, and landside buffer zones to reduce system vulnerability

Benefits

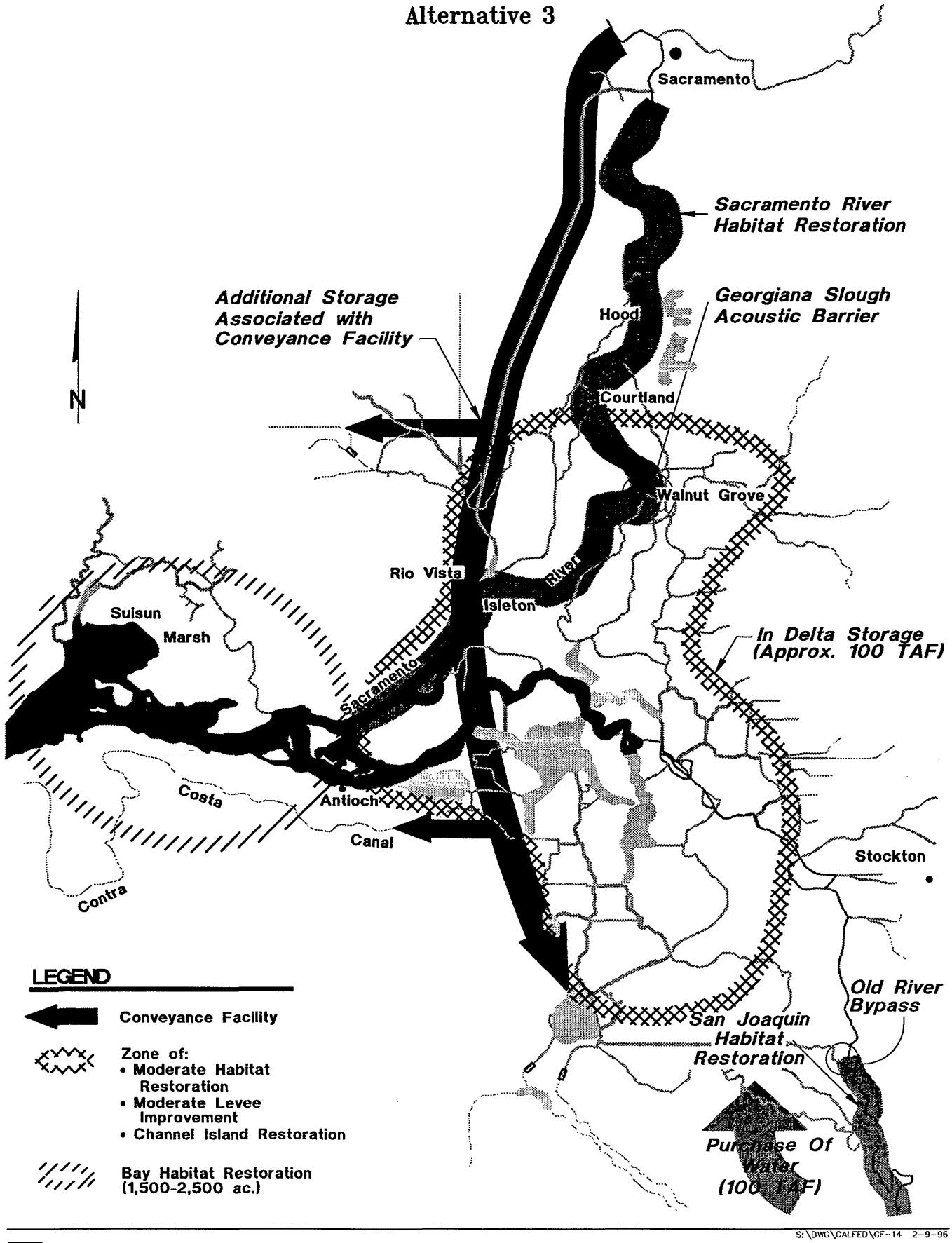
- Improves physical habitat and San Joaquin River instream flows
- Reduces pollutant mass loadings, improves timing of pollutant discharges, and improves Delta water quality
- Improves flexibility, supply, reliability, and increases opportunities for water transfers
- Improves Sacramento Valley and export supply reliability by reducing fish entrainment
- Reduces Delta island vulnerability and vulnerability of export supplies

Constraints and Concerns

- Fish mortality in south Delta export facilities not eliminated
- Screening and real-time monitoring may not be as effective as necessary
- Export water quality improves proportionally to south Delta export flexibility
- Possible south Delta diversion water storage, water quality, and tide circulation problems
- Potential impacts on American River migrating fish
- Possible new entrainment of salmon smolts into the Sacramento diversion intake

Ship Channel Conveyance

Alternative 3



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CALFED BAY-DELTA PROGRAM

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B-001105

Alternative 3
Ship Channel Conveyance

Overview

relocate portion of Delta export diversions

This alternative emphasizes a combination of habitat restoration, system reliability improvements, and actions to improve water supply. A portion of Delta export diversions will be relocated to one location upstream of the Delta to improve export water quality. State-of-the-art fish screens will be installed to protect fish from entrainment at the diversion. Water storage facilities will be constructed in the Delta, increasing the capacity to capture, store, and use flows for environmental and water supply benefits.

diversion upstream of "critical habitat for Delta smelt"

High quality water will be diverted from the Sacramento River upstream of the Sacramento Weir and above the identified "Critical Habitat for Delta Smelt". Water would be transported through an isolated conveyance facility that connects to the Sacramento Ship Channel. The ship channel will be converted to a water transport facility, or will work in concert with a parallel facility in the Yolo Bypass. Locks and/or fish barriers will be added to prevent fish from entering the channel. At the channel's southern terminus, the water would be conveyed by siphons and canals across the Delta to the southern pumps.

new storage has multiple uses

New storage totaling approximately 200,000 acre-feet will be constructed along the northern section of the channel. This stored water can be used for export or direct release into the Sacramento River to transport fish out of the Delta. Direct connections could be made to the North Bay Aqueduct, Contra Costa Canal, and the South Bay Aqueducts. This would allow exchanges that could improve operational flexibility of the Delta pumps in order to minimize fish impacts. Water storage will be constructed on Delta islands to better manage water transfer and capture unregulated flows. This storage will also minimize storage constraints on exports, and help to provide water to users during critical periods while avoiding adverse effects on fish. In addition, water will be purchased from San Joaquin River users to improve transport of fish through the Delta and improve south Delta water quality.

benefits in four objective areas

This alternative combines water supply actions and environmental restoration with actions to improve levee stability and protect land uses and infrastructure in the Delta. Upstream of the Delta, screening of high and moderate priority diversions will increase fish populations. In the Delta, levees will be improved to protect critical western islands and islands with important local and regional infrastructure or important habitat. Restoration of riverine and riparian habitat and Suisun Bay tidal wetlands, in combination with substantial levee improvements, will provide environmental and system reliability benefits. Water quality improvements in the Delta are achieved through pollutant source control actions. By providing a new upstream diversion point and an isolated conveyance facility for a portion of Delta exports, this alternative provides better diversion management, reduced fish

entrainment and improved export water quality. Additional water storage further maximizes system flexibility to meet Delta and export needs, while combined levee and habitat improvements provide increased system reliability and environmental benefits.

Physical and Structural Features

Habitat Restoration

Activities	Benefits
• Restore riparian, shaded riverine, and shallow water habitat along the **Sacramento River channel** between Sacramento and Collinsville	• Provides substantial improvement in aquatic habitat as well as improvements in water supply reliability and water quality • Increases survival and spawning success of anadromous and Delta native fish
• Restore **Delta and floodway corridor** shallow water, riparian, terrestrial, and tidal wetland habitat	• Provides spawning areas for Delta native fish and forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Provides improvements in water supply reliability and water quality
• Restore approximately 75 to 125 miles of shallow water, riverine, and riparian habitat along **Delta levees**	• Provides spawning areas for Delta native fish and forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Provides improvements in water supply reliability and water quality
• Restore and protect **channel islands** from erosion and enhance habitat	• Provides habitat for aquatic and terrestrial plant and animal species • Improves water quality
• Restore about 1,500 to 2,500 acres of tidal wetlands in **Suisun Bay**	• Provides wet year spawning habitat for Delta smelt, rearing areas for salmon, and wildlife habitat (e.g. canvasback and redhead ducks)
• Restore riverine channel features in the **San Joaquin River** above the Delta to lower water temperature and to protect young fish from predation and straying	• Improves fish survival

Considerations
• **Sacramento River Channels** – Feasible and cost-effective habitat restoration implemented between Sacramento and Collinsville.
• **Delta** – Candidate areas for shallow water habitat restoration include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Candidates for Delta levee habitat restoration include Twitchell Island along Threemile Slough and Sevenmile Slough, Georgiana Slough, and the North and South Forks of the Mokelumne River.
• **Floodway Corridors** – Habitat restoration must not impair capacity of floodways.
• **Suisun Bay** – Convert diked wetlands or create tidal wetlands with dredge spoils between Collinsville and Carquinez Strait.
• **San Joaquin River** – Confine wide, shallow channels and isolate in-channel gravel quarry areas. May not be self-sustaining.

Water Transport

Activities	Benefits
• Construct a **new, screened diversion** point for a portion of export supplies on the Sacramento River upstream from Sacramento.	• Reduces entrainment of fish during export diversion • Location is above "Critical Delta Smelt Habitat" • Improves export water quality because it is above Sacramento WWTP and storm water runoff
• Construct a **new conveyance facility** to transport water using canals and siphons from the new diversion point across the Delta to existing pumping plants in the south Delta	• Improves export water quality for export users • Offers the capability to provide water supplies to users on the North Bay Aqueduct, Contra Costa Canal, and the South Bay Aqueducts • Improves water supply reliability by adding flexibility of a second diversion point upstream of most Delta native fish habitat

Considerations
• Diversion and conveyance facility sized to transport up to 10,000 cfs for export.
• Diversion at a location upstream of the Delta near or above the Sacramento Weir.
• Use best available screening technology to minimize fisheries impacts.
• Siphons will carry conveyance facility beneath existing Delta channels to minimize environmental, water quality, and flood conveyance impacts.

Water Storage

Activities	Benefits
• Construct approximately 200,000 AF of **new water storage** along northern portion of isolation facility	• Provides additional diversion flexibility • Improves fish transport through Delta through strategic releases • Could be used to manage X2 requirements • Improves water supply reliability
• Develop about 100,000 AF of **new water storage** in the Delta dedicated to environmental uses	• Provides additional diversion flexibility • Reduces entrainment of fish • Reduces frequency and duration of export curtailments, thus improving water supply reliability • Improves fish transport through the Delta • Could significantly improve response time (compared to Folsom and Shasta reservoirs) for releasing water for improved management of X2

Considerations

- Locate new environmentally dedicated Delta storage reservoir near export pumps on one or more islands such as Bacon, Mandeville, or Victoria.
- Locate new storage along northern portion of facility on one or more islands such as Ryer, Brannan, or Prospect.
- Divert water during November, December, and January; release water from March to July as needed. With real-time monitoring, divert when species of concern are not present and release water to move fish or release for diversion.
- Environmentally dedicated water storage in the Delta allows reduction in diversions during critical periods.
- Creation of a wide riparian and shallow water habitat corridor around the perimeter of Delta island storage would provide additional fish and wildlife benefits.

Fish Protection and Transport

Activities	Benefits
• Construct a **San Joaquin River bypass** at the head of Old River	• Encourages outmigrating fish to stay in San Joaquin River • Allows for managing flows down Old River
• Install **fish screens** on moderate and high priority diversions in the Delta, rivers, and tributaries	• Reduces entrainment of fish
• Construct new screened State Water Project intake at **Italian Slough**	• Avoids fish predation and entrainment in Clifton Court Forebay when diversion rates are low
• Improve drainage in **floodway corridors**	• Reduces fish stranding

Considerations
• Select diversions for screening according to criteria including size of intake, location, peril to fish, and screening feasibility.

Flood Protection and Levee Stabilization

Activities	Benefits
• Provide a **moderate level of protection and stabilization** of Delta levees through levee maintenance and stabilization actions	• Manages vulnerability of Delta land use and infrastructure • Manages vulnerability of Delta water supply to salinity intrusion • Manages vulnerability of Delta ecosystem functions • Provides opportunities for habitat restoration
• **Improve flood conveyance capacity** of Delta channels through channel maintenance and improvements	• Manages vulnerability of Delta functions • Improves flood conveyance • Provides opportunities for habitat restoration

Considerations
• Provide flood protection equivalent to Army Corps of Engineers PL 99 standard for these islands: All critical western islands such as Jersey Island. Islands with important regional infrastructure (e.g., Highway 12) such as Terminous Island. Islands with both valuable habitat and important regional infrastructure (e.g., transmission lines) such as Lower Roberts Island. • Upgrade all other Delta levees to meet at least the Hazard Mitigation Plan (HMP) standards. • Integrate protection and stabilization of levees with Delta habitat restoration activities. • Provide stable funding mechanism for ongoing levee and habitat monitoring, maintenance, and management. • Improvements to channels include dredging to remove sediment in channels with restricted flood capacity.

Operational and Management Features

Water Diversion Management

Activities	Benefits
• **Acquire about 100,000 AF** of water from willing sellers in the **San Joaquin basin**	• Transports fish through San Joaquin River and Delta • Improves water quality • Improves management flexibility for diversions to reduce fish loss
• **Improve CVP and SWP operations** through predation control, coordinating operations, and improving fish salvaging and handling	• Reduces fish losses
• Improve **real-time monitoring** of locations of fish species of special concern and modify water diversions to avoid fish entrainment	• Provides an additional tool to help reduce entrainment of special-concern species • Improves flexibility to divert water during critical fish migration periods
• Evaluate, improve, and install **behavioral barriers** for anadromous fish	• Diverts anadromous fish from areas of potential entrainment and predation • Allows for continued water diversions at current locations
Considerations	
• Can use San Joaquin environmental water for pulse flows to aid fish transport or dilute poor quality flows • Coordinate use of San Joaquin environmental water with the operation of new Delta storage to improve timing of diversions • Evaluate continued use of an acoustic barrier at the mouth of Georgiana Slough. • Evaluate behavioral barriers for Delta Cross Channel and Threemile Slough.	

Fisheries Management

Activities	Benefits
• **Mark salmon** produced in hatcheries	• Facilitates selective catch of hatchery salmon by commercial and recreational fisheries
• Conduct **net-pen rearing of striped bass** to supplant natural production	• Maintains recreational fishery • Reduces operational constraints on water diversions
Considerations	
• Actions are intended to maintain recreational and commercial fisheries as well as enhance native salmon stocks. • Need to assess impact of incidental mortality on native (unmarked) fish.	

Water Quality Management

Activities	Benefits
• Increase enforcement of source control regulations for **agricultural drainage** and implement agricultural best management practices for water quality	• Improves Delta water quality
• Increase enforcement of source control regulations for **urban and industrial runoff** and implement best management practices for water quality	• Improves Delta water quality
• Integrate existing **land retirement and fallowing** programs for agricultural lands with drainage problems	• Improves Delta water quality
• Integrate existing and support appropriate on-site **mine drainage remediation** measures to the maximum extent feasible	• Improves Delta water quality
Considerations	
• Identify priority pollutant sources such as Iron Mountain Mine and west-side San Joaquin agricultural lands. • Provide regulatory and institutional incentives for implementation of remediation measures.	

Institutional and Policy Features

Habitat Programs

Activities	Benefits
• Integrate recommended **habitat restoration actions from other programs**, including CVPIA and the Anadromous Fish Restoration Program	• Provides additional habitat restoration
• Establish programs to **preserve agricultural land uses** that provide valuable habitat functions	• Protects existing habitats
• Establish a CALFED team to coordinate and **expedite habitat restoration permits**	• Accelerates acquisition of permits for environmental restoration projects and other CALFED projects
• Establish and fund a management program and rapid response team to **manage introduced species**	• Protects existing valuable species and habitat
• Establish a program to identify and use clean **dredge materials** from the Delta for habitat restoration and levee maintenance in the Delta	• Provides materials for habitat and levee improvements
• Encourage farmers and levee maintenance districts to **leave habitat areas undisturbed** by working with resource agencies	• Protects existing habitats • Increases flexibility in maintenance programs

Considerations
• Coordinate activities to avoid duplication.

Water Quality Standards

Activities	Benefits
• **Reevaluate Delta export/inflow ratios** during triennial reviews as habitat effectiveness is realized	• Allows for higher level of water transfer as fishery populations improve
Considerations	
• Monitor to verify effectiveness of habitat and entrainment reduction programs. Develop an adaptive management program to modify habitat restoration and export/inflow ratios in response to improved sustainability of important species.	

Management of System Vulnerability

Activities	Benefits
• Establish and fund an **emergency levee management plan** to respond to levee failures	• Provides resources to protect Delta functions through proactive and preventative measures
• Establish **landside buffer zones** adjacent to levees on islands with deep peat soils	• Provides increase in stability of Delta levees and reliability of Delta functions by reducing subsidence adjacent to levees • Could be used to provide habitat benefit
Considerations	
• Determine extent and cost effectiveness of levee management programs and buffer zones. • Buffer strip approximately 100 to 150 yards wide dedicated to shallow wetlands.	

Preliminary Assessment

Benefits

- Improves physical habitat and San Joaquin River instream flows and reduces fish mortality caused by diversions
- Reduces pollutant mass loading, improves timing of pollutant discharges and improves export water quality
- Improves flexibility, supply, reliability, and increases opportunities for water transfers
- Improves supply reliability by reducing fish entrainment
- Significantly reduces Delta island vulnerability and vulnerability of export supplies

Constraints and Concerns

- Fish mortality in south Delta export facilities not eliminated
- Possible new entrainment of salmon smolts into the Sacramento diversion intake
- Best available screening technology and real-time monitoring may not be as effective as necessary to avoide entrainment effects at diversion locations
- Export water quality will only improve proportionally to the flexibility provided to manage south Delta exports
- South Delta may experience water stage, water quality, and flow circulation problems
- Potential impacts on American River migrating fish